U.S. Coast Guard
Marine Safety Office, Portland, Maine

SAFETY ALERT '02-01

Confined Space Hazards on Fishing Vessels

Recently several commercial fishermen have been killed or seriously harmed after being overcome by a hazardous atmosphere aboard their vessel. Such incidents usually happen while the victims are working in a 'confined space', and can occur without warning. The victims, and often would-be rescuers, are rapidly incapacitated.

Confined Space: A confined space is generally any space that: (1) is large enough to accommodate a person; (2) has limited or restricted means of entry and exit; (3) is not *designed* for continuous occupancy. Confined spaces typically found on fishing vessels include fish holds, voids, tanks, deep bilges, and the lazarette.

Hazards: Confined spaces can readily trap and hold dangerous air contaminants. Some of the most common atmospheric hazards found in confined spaces are:

- Oxygen deficiency- Created by oxidation (rust), chemical reaction, combustion, organic decomposition, or displacement by other gases, fumes, or vapors. Causes asphyxiation.
- Hydrogen Sulfide (H_2S)- Common yet highly toxic gas, created by decomposition of organic materials such as fish products, bait, gurry, mud, etc. Characteristic rotten-egg smell may not be detectable. Hydrogen sulfide gas is also flammable.
- Carbon Monoxide (CO)- Created by incomplete combustion of organic fuels such as gasoline, diesel, kerosene, oil, or wood. The most likely sources on a vessel include engine exhaust and portable heaters. Carbon monoxide is odorless, tasteless, and colorless. Causes asphyxiation.
- Ammonia- May be formed by decomposition of fish products, but more commonly occurs from leaks in a refrigeration system. Characteristic odor, it is also an eye and nose irritant.
- Explosive gases/vapors, including fuel vapors, paint & solvent fumes, methane (from decomposition), welding gases, and hydrogen gas (from batteries).
- Other hazardous air contaminants include carbon dioxide (from decomposition/combustion), freon (a refrigerant), nitrogen dioxide (combustion), sulfur dioxide (combustion), diesel fumes, and welding fumes.

Signs & Symptoms: It is important to understand that the first symptom of exposure to a hazardous atmosphere might very well be death or incapacitation. You simply cannot rely on your senses for sufficient warning. Symptoms of low-level exposure could be headache, nausea, vomiting, dizziness, flushed skin, respiratory difficulty, diarrhea, excitement, or drowsiness.

Precautions: There are many practical things you can do to minimize the risk of a fatal confined space accident on your vessel:

- Make sure your crew is aware of the risks of confined spaces, which spaces on your vessel are considered potentially hazardous, and the necessary precautions.
- Install an adequate means of fresh air ventilation for suspect compartments. A powered supply blower is preferable, but even good passive ventilation is better than none. Allow spaces to ventilate sufficiently before entering, and maintain ventilation while the space is occupied.
- Never enter a space if you think it could be hazardous. Do not enter a confined space to rescue a collapsed person without proper protective equipment (self-contained breathing apparatus). Without this equipment you could easily become the next victim.
- Do not enter a confined space without notifying someone beforehand. Use the buddy system, have someone observe from outside while you work in the space.
- Make sure the space has an adequate and secure ladder or other means of entry and escape.
- Keep confined spaces free of rust, hazardous chemicals, engine exhaust, and excess organic materials. Keep fish holds clean.
- Inspect exhaust systems for leaks regularly, and repair promptly. Do not use fuel-burning heaters without adequate ventilation.
- Use atmospheric testing equipment to check spaces for oxygen content and presence of hazardous gases. Atmospheric testing and monitoring equipment can be purchased from many industrial and safety supply houses. Such equipment should only be used by trained and competent persons.
- Install carbon monoxide alarms in engine and crew spaces.
- Have a professional safety consultant evaluate your vessel to identify hazards and recommend solutions. They can be found in the yellow pages of most cities under 'Safety Consulting'. Additionally, some states (such as Maine) offer no-cost safety consulting through the State Department of Labor.

Confined spaces can be deadly. This Safety Alert provides a brief overview of the hazards involved, but is by no means comprehensive. You are encouraged to learn more about these hazards, and share the information with your crew. Take steps today to prevent a confined space accident on your vessel.

For more information please contact:
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http://www.uscg.mil/d1/units/msoport/